

CLAIMS

What is claimed is:

1. A column assembly of a vehicle having a steering column to be releasably locked and unlocked, said assembly comprising:

5 a steering column rotatable about a central axis;

a lock bolt moveable from an unlocked position to a locked position to lock said steering column against rotation whereby a load is imparted to said lock bolt when in said locked position restricting movement of said lock bolt from said locked position to said unlocked position;

10 a lock bolt drive connected to said lock bolt for moving said lock bolt from said locked position to said unlocked position, said load preventing said lock bolt drive from moving said lock bolt from said locked position to said unlocked position; and

a release mechanism operative to reduce said load on said lock bolt
15 sufficiently to enable said lock bolt drive to move said lock bolt from said locked position to said unlocked position.

2. An assembly as set forth in claim 1 wherein said release mechanism further comprises a release drive engaging one of said steering column and said lock bolt drive to rotate either one of said steering column and said lock bolt drive
20 circumferentially to release said load.

3. An assembly as set forth in claim 2 wherein said release drive is further defined as an electric motor.

4. An assembly as set forth in claim 2 wherein said release drive is further defined as a hydraulic motor.

5. An assembly as set forth in claim 2 wherein said release drive is further defined as a pneumatic motor.

5 6. An assembly as set forth in claim 2 wherein said release mechanism is further defined as including a worm disposed between said release drive and said steering column for rotating said steering column circumferentially.

7. An assembly as set forth in claim 6 wherein said release mechanism is further defined as including a worm gear disposed between said worm and said
10 steering column.

8. An assembly as set forth in claim 7 wherein said worm gear further defines a plurality of holes spaced circumferentially about said worm gear for receiving said lock bolt.

9. An assembly as set forth in claim 2 wherein said lock bolt drive is further
15 defined as including an electric motor.

10. An assembly as set forth in claim 9 wherein said lock bolt drive is further defined as including a switch for actuating said electric motor.

11. An assembly as set forth in claim 2 wherein said lock bolt drive is further defined as including a worm and a worm gear disposed between said motor and said
20 lock bolt.

12. An assembly as set forth in claim 11 wherein said lock bolt drive is further defined as including a housing having a front cover and a rear cover such that said lock bolt extends from said front cover.

13. An assembly as set forth in claim 12 wherein said housing of said lock bolt drive is formed integrally within said release mechanism.

14. An assembly as set forth in claim 13 further including a power source for actuating both of said lock bolt drive and said release mechanism.

15. An assembly as set forth in claim 12 wherein said lock bolt drive is further defined as including a spring disposed between said lock bolt and said rear cover for biasing said lock bolt from said housing.

16. An assembly as set forth in claim 1 wherein said steering column further defines a plurality of apertures for receiving said lock bolt.

17. An assembly as set forth in claim 16 wherein said plurality of apertures are further defined as spaced circumferentially about said steering column.

18. An assembly as set forth in claim 1 further comprising a sensor in communication with said lock bolt drive and said release mechanism for sensing said load on said lock bolt.

19. An assembly as set forth in claim 18 further comprising a processor in communication with said sensor, said lock bolt drive, and said release mechanism for coordinating operation of said lock bolt drive and said release mechanism to release said load.

20. A method of locking and unlocking a steering column within a column assembly of a vehicle with a lock bolt moveable between a locked and unlocked position by a lock bolt drive, said method comprising:

locking the steering column with the lock bolt;

5 imparting a load on the lock bolt in response to locking the steering column with the lock bolt sufficient to prevent the lock bolt drive from being able to move the lock bolt to the unlocked position; and

reducing the load on the lock bolt to enable the lock bolt drive to move the lock bolt from the locked position to the unlocked position.

10 21. A method as set forth in claim 20 wherein the step of releasing the load is further defined as rotating one of the steering column, the lock bolt, and the lock bolt drive circumferentially about a central axis to sufficiently reduce the load.

22. A method as set forth in claim 21 further comprising the step of moving the lock bolt to the unlocked position in response to the load on the lock bolt being
15 reduced.

23. A method as set forth in claim 22 further comprising the step of sensing the load on at least one of the steering column, the lock bolt, and the lock bolt drive as preventing movement of the lock bolt.

24. A method as set forth in claim 23 further comprising the step of
20 simultaneously actuating the release mechanism and the lock bolt drive in response to sensing the load.

25. A method as set forth in claim 20 wherein the step of locking the steering column is further defined as moving the lock bolt into engagement with one of the steering column and the release mechanism.

26. A method as set forth in claim 20 wherein the step of locking the steering
5 column is further defined as moving the lock bolt into cooperation with the steering column.

27. A method as set forth in claim 26 wherein the step of releasing the load is further defined as rotating the steering column about a central axis to release the load on the lock bolt.

10 28. A method as set forth in claim 27 further including the step of moving the lock bolt out of cooperation with the steering column to allow rotation about the central axis.

29. An electric power steering system for a vehicle, said system comprising:
15 a steering column rotatable about a central axis for steering said vehicle;
a column assembly comprising;
a lock bolt moveable from an unlocked position to a locked position to lock said steering column against rotation whereby a load is imparted to said lock bolt when in said locked position restricting movement of said lock bolt from said locked
20 position to said unlocked position,

a lock bolt drive connected to said lock bolt for moving said lock bolt from said locked position to said unlocked position, said load preventing said lock bolt

drive from moving said lock bolt from said locked position to said unlocked position,
and

an electronic steering assist mechanism comprising an electric motor engaging
said steering column and being operative to reduce said load on said lock bolt
5 sufficiently to enable said lock bolt drive to move said lock bolt from said locked
position to said unlocked position. and for providing feedback while steering said
vehicle.

30. A system as set forth in claim 29 wherein said electronic steering assist
mechanism is further defined as including a worm disposed between said electric
10 motor and said steering column for rotating said steering column circumferentially to
reduce said side load and to provide feedback.

31. A system as set forth in claim 30 wherein said electronic steering assist
mechanism is further defined as including a worm gear disposed between said worm
and said steering column.

15 32. A system as set forth in claim 31 wherein said worm gear further defines a
plurality of holes spaced circumferentially about said worm gear for receiving said
lock bolt.